

REMARKS

The present application was filed on July 31, 2000 with claims 1-49. Claims 1, 14, 20, 23, 26, 38, 45 and 48 are the independent claims.

Applicants respectfully request reconsideration of the application in view of the above amendments and the remarks below.

The Examiner has objected to the drawings as allegedly failing to show certain elements recited in the claims. Applicants respectfully traverse, and submit that the drawings in their present form are compliant with the pertinent regulation, namely, 37 C.F.R. §1.83(a). This regulation states that the drawings “must show every feature of the invention specified in the claims.” Applicants initially wish to point out that the regulation at issue does not require that each and every element in a given claim have a corresponding separately-identifiable drawing element. Instead, the regulation requires that the drawings show every feature of the claimed invention, and the present drawings are believed to meet this requirement.

Applicants note that the objected-to elements, which include “multicast routing table,” “bridging unit,” “multicast detector,” “layer-3 routing unit,” “subscription information,” “layer-3 output unit,” and “multicast routing unit,” are in fact shown in the drawings, as one or more of the switches 34 of FIGS. 2 or 5. See the specification at, for example, page 9, lines 13-18 and page 10, lines 7-20.

For example, the specification at page 10, lines 8-10 indicates that the “multicast detector” can be implemented entirely in software within a given one of the switches 34. Thus, it is appropriate for Applicants to show the associated claim feature in the drawings by simply showing a switch 34 that implements such software. Similarly, the “multicast routing table” may be implemented entirely in software within a given one of the switches 34, as indicated at page 12, lines 15-19 of the specification, and the associated claim feature is thus properly shown in the drawings by simply showing a switch 34 that implements such software. The same argument applies to the “subscription information” and to the other objected-to elements of the claims. These elements are all implementable in hardware, software or combinations thereof within switch 34, as described at page 10, lines 7-20 of the specification.

The objection to the drawings under 37 C.F.R. §1.83(a) is therefore believed to be improper, and should be withdrawn.

The Examiner has objected to claim 4 on the ground that its language is allegedly “very awkward to read.” Applicants respectfully disagree, but nonetheless have amended the claim to introduce punctuation which is believed to facilitate the reading of the claim. The objection should therefore be withdrawn.

The Examiner has rejected claim 4 under 35 U.S.C. §112, second paragraph, on the ground that the term “legal interface” is allegedly indefinite. Applicants respectfully disagree. The term in question is clearly described in the specification at, for example, page 11, line 29 to page 12, line 5. The cited portion of the specification provides as follows, with emphasis supplied:

In addition, switches 34 list for each multicast or source group, the VLAN segments which should receive the multicast packets of the group according to the multicast routing protocol they use. In some embodiments of the invention, these listings, optionally together with information from the unicast routing table of the switch, are used to create a multicast routing table which states for each multicast group or source group the interfaces through which the packets are to be forwarded and optionally a legal interface of the group, as is known in the art. Generally, multicast packets received through the legal interface of their source group, are routed by the switch, while multicast packets received through other interfaces are not routed by the switch. In some embodiments of the invention, the legal interface of the multicast packet is the VLAN segment through which a unicast packet would be transmitted from switch 34 to the source of the multicast packet (identified from the source IP address of the packet).

Also, other portions of the specification provide additional description regarding the term in question. For example, page 12, lines 31-32, of the specification indicates that the legal interface associated with a given packet in the illustrative embodiment described comprises “the VLAN segment which leads to the source of the packet.” As another example, page 14, lines 19-20, of the specification indicates that “each switch has only a single legal interface.” Thus, the term in question

is in fact clearly described in the specification. The §112 rejection of claim 4 is thus believed to be improper, and should be withdrawn.

Each of independent claims 1, 14, 20, 23, 38, 45 and 48, and a number of associated dependent claims, stands rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 5,959,989 (hereinafter "Gleeson"). Applicants respectfully traverse.

The Manual of Patent Examining Procedure (MPEP), Eight Edition, August 2001, §2131, specifies that a given claim is anticipated "only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference," citing Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Moreover, MPEP §2131 indicates that the cited reference must show the "identical invention . . . in as complete detail as is contained in the . . . claim," citing Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). For the reasons identified below, Applicants submit that the Examiner has failed to establish anticipation of at least independent claims 1, 14, 20, 23, 38, 45 and 48 by the Gleeson reference.

Independent claim 1 is directed to a method of determining local multicast information of a local area network (LAN), and includes the steps of dividing the LAN to a number of segments larger than the number of virtual LANs (VLANs) in the network, and creating a layer-3 multicast routing table, which relates to each of the segments separately.

The Examiner in formulating the §102(e) rejection argues that the limitations of independent claim 1 are met by the teachings of Gleeson in FIGS. 2A, 2B, 2C and 3, and the associated text. Applicants respectfully disagree. The tables 240, 250, 308 or 312 of Gleeson, whether viewed individually or collectively, entirely fail to meet the limitation at issue, that is, these tables do not comprise a layer-3 multicast routing table which relates to each of the segments separately as claimed. The "segments" in Gleeson identified by the Examiner allegedly include "Red, Green and Blue segments in trunk line 231" (Office Action, page 4, lines 3-8). However, Gleeson in column 8, lines 6-13, clearly indicates that the Red (R), Green (G) and Blue (B) designations are VLAN designations, and thus these elements cannot comprise the claimed segments, which are explicitly identified as being distinct from VLANs in the claim. Also, the entries of the Gleeson tables identified by the Examiner refer to VLAN designations, but not to network segments as would be

required by the claim. For example, there is no reference in the relied-upon tables to particular trunk lines, such as trunk line 231 as identified by the Examiner, which Gleeson in column 8, lines 1-2, describes as comprising “a point-to-point link.”

Since Gleeson fails to teach or suggest each and every limitation of claim 1 in as complete detail as is contained in the claim, as required by the above-cited MPEP §2131, claim 1 is not anticipated by Gleeson. Also, the associated dependent claims 2-13 are believed allowable at least by virtue of their dependence from claim 1.

Independent claim 14 is directed to a method of forwarding multicast packets by a layer-3 switch, and includes the steps of receiving a multicast packet by the switch through a first physical port on a first VLAN, and routing the multicast packet in layer-3 out a second physical port of the switch, on the first VLAN.

The Examiner argues that the limitations of claim 14 are met by intermediate device 222 of FIG. 2A in Gleeson. Applicants respectfully disagree, on the ground that the intermediate device 222 of FIG. 2A is described in column 7, line 56, of Gleeson as “a switch or hub” generally, and not as a layer-3 switch as claimed. Thus, the relied-upon portions of Gleeson fail to meet the limitations of claim 14.

Notwithstanding the traversal, Applicants have amended independent claim 14 to incorporate the limitations of dependent claim 18, which specify that the multicast packet is bridged in layer-2 through a third physical port of the layer-3 switch. Dependent claims 18 and 19 have been canceled. Independent claim 14 as amended, and its associated dependent claims 15, 16 and 17, are believed to be allowable.

Independent claim 20 is directed to a method of forwarding multicast packets within a single VLAN. The method includes the steps of receiving the multicast packets by a first switch connected to the VLAN, routing the multicast packets in layer-3 to a second switch connected to the VLAN, and routing the multicast packets in layer-3 by the second switch through an interface included in the VLAN.

The Examiner argues that the limitations of claim 20 are met by the arrangement of intermediate devices 220 and 221 as shown in FIG. 2A of Gleeson. Applicants respectfully disagree. Again, each of the intermediate devices 220 and 221 of FIG. 2A is described in column 7, line 56,

of Gleeson as comprising “a switch or hub” generally, and not as a layer-3 switch as claimed. Thus, the relied-upon portions of Gleeson fail to meet the limitations of claim 20. Independent claim 20, and its associated dependent claims 21 and 22, are therefore believed to be allowable.

Independent claim 23 is directed to a method of forwarding multicast packets within a single VLAN. The method includes the steps of receiving multicast packets of a specific destination address and source address by a first switch connected to the VLAN, routing the received multicast packets in layer-3, by the first switch, to at least one first host connected to the VLAN, receiving multicast packets of the specific destination address and source address by a second switch connected to the VLAN, and routing the multicast packets in layer-3, by the second switch, to at least one second host.

The Examiner in rejecting claim 23 under § 102(e) relies on the intermediate devices 222 and 223 arranged as shown in FIG. 2A of Gleeson. However, for reasons similar to those given above with regard to claims 14 and 20, the relied-upon arrangement fails to meet the particular layer-3 routing arrangement that is claimed. There is simply no mention whatsoever in Gleeson that the intermediate devices necessarily comprise layer-3 switches, rather than, for example, layer-2 switches. Thus, the relied-upon portions of Gleeson fail to meet the limitations of claim 23. Independent claim 23, and its associated dependent claims 24 and 25, are therefore believed to be allowable.

Independent claim 38 is directed to a layer-3 switch, comprising at least one VLAN interface which does not have an associated IP router interface, and a layer-3 output unit which directs IP packets with a MAC source address of the switch through the at least one VLAN interface.

The Examiner argues that the limitations of claim 38 are shown in the arrangement of intermediate devices 220 and 221 of Gleeson FIG. 2A. However, as Applicants have indicated previously, there is no specific teaching in Gleeson to the effect that any particular one of the intermediate devices shown in FIG. 2A comprises a layer-3 switch having a layer-3 output unit configured as claimed.

Notwithstanding the traversal, Applicants have amended independent claim 38 to incorporate the limitations of dependent claim 44, which specify that the layer-3 output unit directs packets through the at least one VLAN interface, with an IP source address associated with a different VLAN

interface of the switch. Dependent claim 44 has been canceled. Independent claim 38 as amended, and its associated dependent claims 39-43, are believed to be allowable.

Independent claim 45 is directed to a method of forwarding packets, and includes the steps of receiving a packet with a source MAC address and a TTL value, changing the source MAC address of the received packet, and forwarding the packet with the changed MAC address but with the same TTL value.

The Examiner in rejecting claim 45 under §102(e) argues that the limitations are shown in column 12, line 40, column 13, lines 50-52, and in the frames 402a of FIG. 4A and 610 of FIG. 6. Applicants respectfully disagree. Gleeson at column 13, lines 50-52, states as follows:

The controller 306 may perform conventional routing functions to the IP header field 404, such as decrementing a time-to-live (TTL) value (not shown).

The Examiner characterizes this teaching as allegedly disclosing the forwarding of a packet with a changed MAC address but with the same TTL value as claimed. However, the relied-upon passage does not imply that a packet will be forwarded without decrementing its TTL value. Instead, it simply states that the performance of conventional routing functions is optional. This is because the “may” in the relied-upon passage applies to the performance of conventional routing functions. Once a decision is made to configure the controller 306 to perform a conventional routing function, such as decrementing the TTL value, it will apparently always decrement that value, as would be expected in accordance with conventional practice. The relied-upon teachings thus not only fail to meet the limitations in question, but actively teach away from them. Independent claim 45 and its associated dependent claims 46 and 47 are therefore believed allowable.

Independent claim 48 is directed to a switch comprising a plurality of ports, a layer-3 multicast routing table, which identifies interfaces to which multicast packets should be routed according to both a VLAN and a port, and a multicast routing unit which routes multicast packets between the ports of the switch based on entries of the multicast routing table.

The Examiner argues that the claimed switch is met by intermediate units 220 to 223 of FIG. 2A, table 250 of FIG. 2C, and multicast controller 306 of FIG. 3. Applicants respectfully disagree.

The claim calls for a switch that includes a multicast routing unit. The Examiner identifies switches 220 through 223, but none of these switches includes the multicast controller 306. Instead, the multicast controller 306 is described in column 9, lines 35-36, as being an element of a multicast network device (MND), such as MND 226 or MND 228 of FIG. 2A, that is entirely separate from switches 220 through 223. Thus, there is no switch disclosed in Gleeson which meets the limitations of claim 48. Independent claim 48, and its associated dependent claim 49, are therefore believed allowable.

Independent claim 26, and its associated dependent claims, stand rejected under 35 U.S.C. §103(a) as being unpatentable over Gleeson in view of U.S. Patent No. 5,796,732 (hereinafter "Mazzola"). Applicants respectfully traverse the §103(a) rejection.

Claim 26 is directed to a switch comprising a plurality of ports, a layer-2 bridging unit which bridges packets between the ports responsive to their destination MAC address and their VLAN, and a multicast detector which identifies a group of at least some of the IP multicast routing related packets received by the switch, the group including IGMP queries, and prevents the layer-2 bridging unit from bridging the identified packets at least through ports which do not lead to at least one neighboring layer-3 switch or router.

The Examiner argues that these limitations are met by the combined teachings of Gleeson and Mazzola. Applicants respectfully disagree. In formulating the rejection, the Examiner relies on switches 220 through 223 of FIG. 2A in Gleeson, and multicast controller 306 in FIG. 3 of Gleeson. However, as Applicants noted above, the multicast controller 306 is described in column 9, lines 35-36, as being an element of a multicast network device (MND), such as MND 226 or MND 228 of FIG. 2A, that is entirely separate from switches 220 through 223. Thus, none of the switches 220 through 223 includes a multicast detector as required by claim 26. Gleeson teaches away from such an arrangement by disclosing the use of multicast controller 306 which is separate from any of the switches 220 through 223. The Mazzola reference fails to supplement this fundamental deficiency of Gleeson as applied to claim 26.

Moreover, Applicants submit that the Examiner has failed to establish a proper *prima facie* case of obviousness in the present §103(a) rejection, in that no cogent motivation has been identified

for combining the Gleeson and Mazzola references or modifying the reference teachings to reach the claimed invention.

Regarding motivation to combine or to modify, the Examiner states at page 13, last three lines, of the Office Action that one “would have been motivated to make this modification in order to increase flexibility have the blocking feature.” To the extent this grammatically-incorrect statement is understood, it appears to be nothing more than a conclusory statement of obviousness, and insufficient to support the proposed modification of the reference teachings.

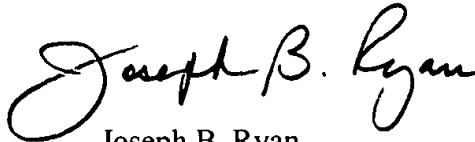
The Federal Circuit has stated that when patentability turns on the question of obviousness, the obviousness determination “must be based on objective evidence of record” and that “this precedent has been reinforced in myriad decisions, and cannot be dispensed with.” In re Sang-Su Lee, 277 F.3d 1338, 1343 (Fed. Cir. 2002). Moreover, the Federal Circuit has stated that “conclusory statements” by an examiner fail to adequately address the factual question of motivation, which is material to patentability and cannot be resolved “on subjective belief and unknown authority.” Id. at 1343-1344. There has been no showing in the present §103(a) rejection of objective evidence of record that would motivate one skilled in the art to combine Gleeson and Mazzola, or to modify the proposed combination of Gleeson and Mazzola, to produce the particular limitations in question. The above-quoted statement of obviousness given by the Examiner in the Office Action is precisely the type of subjective, conclusory statement that the Federal Circuit has indicated provides insufficient support for an obviousness rejection.

The dependent claims are believed allowable for at least the reasons identified above with regard to their respective independent claims.

Moreover, one or more of these dependent claims are believed to define additional separately-patentable subject matter relative to Gleeson, Mazzola and the other art of record.

In view of the foregoing, Applicants respectfully submit that the claims as amended are in condition for allowance, and request withdrawal of the §112, §102(e) and §103(a) rejections.

Respectfully submitted,

A handwritten signature in black ink that reads "Joseph B. Ryan". The signature is written in a cursive style with a large, looping initial "J".

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